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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,319	09/26/2003	Martin W. Weiser	H0004362	5332
21567 7590 03/07/2007 WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			EXAMINER NGUYEN, DILINH P	
			ART UNIT	PAPER NUMBER
			2814	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/670,319	<b>Applicant(s)</b> WEISER ET AL.	
	<b>Examiner</b> DiLinh Nguyen	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/30/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 7-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Regarding claims 1, and 8-9, the limitations, such as: an alpha flux of less than 0.0005 cts/cm<sup>2</sup>/hr; an alpha flux of less than 0.0002 cts/cm<sup>2</sup>/hr or an alpha flux of less than 0.0001 cts/cm<sup>2</sup>/hr render the claims indefinite. The claims comprise the upper limits (0.0005 cts/cm<sup>2</sup>/hr, 0.0002 cts/cm<sup>2</sup>/hr or 0.0001 cts/cm<sup>2</sup>/hr) but without a lower limit for the alpha flux.
- Regarding claim 7, the phrase: "the solder predominately comprises Bi, Cu or In" renders the claim indefinite. The specification fails to disclose the solder predominately comprises Bi, Cu or In.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1-2 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (U.S. Pat. 5965945).

- Regarding claims 1 and 8-9, Miller et al. disclose a semiconductor package comprising a solder having an alpha flux of less than  $0.001 \text{ cts/cm}^2/\text{hr}$  (column 6, lines 25-28). The range of the alpha flux of less than  $0.001 \text{ cts/cm}^2/\text{hr}$  encompasses an alpha flux of less than  $0.0005 \text{ cts/cm}^2/\text{hr}$ ; an alpha flux of less than  $0.0002 \text{ cts/cm}^2/\text{hr}$  or an alpha flux of less than  $0.0001 \text{ cts/cm}^2/\text{hr}$ .
- Regarding claim 2, Miller et al. disclose that wherein the solder predominately comprises Pb (column 6, line 25).
- Regarding claim 6, Miller et al. disclose that the solder is lead-containing solder that is at least 99 weight% lead [the solder having low-alpha lead and suitable additional constituent elements include: Au, Ba, Ca, Cu, Mg or Hg @ 1% by weight] (column 6, lines 25-61).
- Regarding claim 7, in-so-far as clear, Miller et al. disclose that wherein the solder comprises Cu (column 6, line 59).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (U.S. Pat. 5965945) in view of Schrock (U.S. Pat. 6221691).

Miller et al. substantially disclose all the limitations as claimed above except for the solder predominately comprises Ag.

However, Schrock discloses a semiconductor package comprising a die 10, a substrate 22, a solder predominately comprises Ag (column 2, lines 5-10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention

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was made to have the solder predominately comprises Ag because as taught by Schrock into the device structure of Miller et al. in order to improve the heat transfer from the die (column 2, lines 9-10).

6. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (U.S. Pat. 5965945) in view of Andricacos et al. (U.S. Pat. 6224690).

Miller et al. substantially disclose all the limitations as claimed above except for the solder predominately comprises Sn or the solder is substantially lead-free.

However, Andricacos et al. disclose a semiconductor package comprising a solder predominately comprises Sn or the solder is substantially lead-free (cover fig., abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the solder predominately comprises Sn or the solder is substantially lead-free as taught by Andricacos et al. into the device structure of Miller et al. in order to provide an interconnection structure suitable for the connection of microelectronic circuit chips to packages.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (U.S. Pat. 5965945) in view of Iwasaki et al. (U.S. Pat. 6777814).

Miller et al. substantially disclose all the limitations as claimed above except for the solder predominately comprises Bi, Cu or In.

However, Iwasaki et al. disclose a solder connection component predominately comprises Bi, Cu or In (column 6, lines 13-16). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the

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solder predominately comprises Bi, Cu or In as taught by Iwasaki et al. into the device structure of Miller et al. in order to enhance the reliability of the semiconductor device.


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DLN

  
HOA PHAM  
PRIMARY EXAMINER